

DOCUMENT RESUME

ED 274 629

SP 027 979

AUTHOR Wells, W. Tom
TITLE Performance and Safety Characteristics in
Ice-Climbing Equipment Selection.
PUB DATE [86]
NOTE 7p.
PUB TYPE Reports - Research/Technical (143)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Athletic Equipment; Equipment Evaluation; *Equipment
Standards; *Performance; *Safety
IDENTIFIERS *Ice Climbing

ABSTRACT

This study sought to determine whether Alaskan ice climbers place more emphasis on performance characteristics or on safety characteristics when selecting their various ice-climbing equipment. A survey distributed to members of the Alaska Alpine Club and the Alaska Alpine Rescue Group was developed to contain responses related to both safety and performance characteristics of selected pieces of equipment. Ratings were obtained from 37 ice climbers on the following pieces of equipment: (1) harness; (2) helmet; (3) rope; (4) ice screws; (5) crampons; and (6) hand tools. Results showed that climbers feel safety characteristics should be emphasized in selecting those items that are either most important for keeping the climber on the ice or most likely to fail in the event of a fall. The rope and the ice screws fell into this category. No piece of equipment studied was chosen mainly for its performance characteristics. (JD)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

BEST COPY AVAILABLE

PERFORMANCE AND SAFETY CHARACTERISTICS IN ICE-CLIMBING EQUIPMENT SELECTION

W. Tom Wells, Human Performance Laboratory, University of Alaska - Fairbanks

Ice-climbing is an inherently dangerous sport. Climbers negotiate vertical frozen waterfalls with only their skill and marginal safety devices or "protection" keeping them from falls that would result in severe injury or death. Unlike its warm weather parallel of technical rock-climbing, however, the recent increase in the popularity of ice-climbing and its advances in skill level have not been matched by advances in protection development. Just in the last five years, the number of accidents involving ice-climbers reported by the American and Canadian Alpine Clubs has increased five-fold (1,2). While rock-climbing safety development has added impetus to the rise in climb difficulty, ice-climbers' margin of safety is limited by the ability of the ice to absorb force. However, harder and harder ice-climbs are attempted each year. The problem to be studied here is whether, with the advance in ice-climbing skill and performance equipment, the margin of safety supplied by ice-climbing equipment has been reduced to a dangerous level. The purpose of this study was to determine whether Alaskan ice-climbers place more emphasis on performance characteristics or on safety characteristics when selecting their various ice-climbing equipment.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

W. T. Wells

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

- ☐ This document has been reproduced as received from the person or organization originating it.
- ☐ Minor changes have been made to improve reproduction quality.

* Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED274629

SP027 979

METHODS

A survey was constructed to determine the characteristics that climbers felt were important in selecting the various pieces of ice-climbing equipment. Each question was developed to contain responses related to both safety and performance characteristics about one piece of equipment. Performance characteristics were defined as those characteristics that affect the ability of the climber to climb. Safety characteristics were those characteristics that are involved in preventing injury in case of a fall. Some characteristics extraneous to the problem being studied were also included in the possible responses. However, whether the characteristic was a safety, performance, or extraneous variable was not identified to the climbers filling out the survey. Respondents were merely asked to rank the relative importance of each characteristic in the selection of that piece of equipment. There were also some questions measuring important characteristics of the climbers and some questions relating to brands of equipment used. The latter questions were included for the purpose of masking the intent of the survey.

The survey was distributed by mail to the memberships of the the Alaska Alpine Club and the Alaska Alpine Rescue Group. A total of 153 surveys was distributed. Although neither group consists solely of ice-climbers, a group that may have had a higher percentage of ice-climbers with the same access to waterfall ice was not known. This population was not meant to be representative of all ice-climbers. However, the population may

be a good indicator of trends in ice-climbing for two reasons. First, many of the members migrated to Alaska after learning to climb elsewhere and, second, among the members are individuals who are responsible for many of the first ascents of Alaskan ice-climbs.

The results of the climbers responses (n=37) to the survey were analyzed using chi-squared comparisons of observed frequencies of safety versus the performance responses that fell in the top half of the possible ranks for that question. In the case of an odd number of possible ranks, half of the number of possible ranks minus 1 was used. Not all climbers used all pieces of equipment so the n varied from question to question. The low percentage of returns is misleading since only ice-climbers were asked to return the survey.

RESULTS

When looking at the results of this survey, it should be noted that different pieces of equipment can be categorized as performance equipment while others can be considered safety equipment. Those items that keep the climber attached to the ice in case of a fall would be safety equipment. Included here are the safety harness, the rope, and the ice screws. The helmet, which only protects in case of a fall or falling ice, is also a safety item. The hand tools and the crampons would be considered performance equipment. While safety items can be very detrimental to performance, they can not usually aid in

performance. Performance equipment, however, can be very beneficial to the climber's safety because if he or she does not fall, safety is not a factor.

Table 1 shows the results of the chi-squared analysis for the various pieces of equipment. For those items with mainly a safety function there was a mixed response. Climbers definitely felt the safety characteristics of their ropes and ice screws were of more importance than the performance characteristics of those same pieces of equipment. With ropes and helmets, the same emphasis was not shown. Crampons showed a significant emphasis towards safety in characteristic selection, while there was lack of any real significance in hand-tool selection.

Table 1. Chi-Squared Analysis of Safety vs. Performance Characteristics of Various Ice-Climbing Equipment

Equipment	(n)	Safety		Performance		X	p
		Obs.	Exp.	Obs.	Exp.		
Harness	27	48	40.5	17	13.5	2.29	.20
Helmet	22	21	22	17	22	1.18	.30
Rope	34	71	57	8	17	11.4	.001
Ice-screws	33	55	22	33	33	49.5	.001
Crampons	31	18	13.3	27	39.9	5.82	.02
Hand-tools	29	18	14.5	88	72.5	4.15	.20

DISCUSSION

The results of this study show that climbers feel safety characteristics should be emphasized in selecting those items that are either most important for keeping him or her on the ice

or most likely to fail in the event of a fall. The rope and the ice-screws fall into this category. The other safety items may not have been selected for safety features because climbers might have felt that there was a large enough margin of safety in those items or that the item's possible interference to performance was an equally important characteristic.

One of the more interesting findings was the emphasis on safety characteristics over performance characteristics in crampon selection. This may be due to many climbers feeling that there is little difference in crampon selection or that they may not be that important to performance. The same possibilities were shown in hand-tool selection with a lack of real significance between safety and performance emphasis. Perhaps ice-climbers feel that it is mainly their skill that allows them to climb and not the characteristics of their performance tools.

It can be concluded from this investigation that Alaskan ice-climbers chose those pieces of equipment that served mainly a safety function on the basis of safety characteristics. The same relationship was not found for equipment that served mainly a performance function. No piece of equipment studied here was chosen mainly for its performance characteristics. These conclusions indicate that ice-climbers are very concerned with the safety supplied by their equipment. They are aware that as the level of difficulty of their climbing increases that the margin of safety supplied by their equipment must also increase. It is recommended that research and development of safety equipment capable of protecting longer falls on poorer ice

proceed before the incidence of climbing injuries and fatalities increases.

BIBLIOGRAPHY

1. THE AMERICAN ALPINE CLUB. Accidents in North American Mountaineering, 1980. New York, 1980.
2. THE AMERICAN ALPINE CLUB. Accidents in North American Mountaineering, 1984. New York, 1984.